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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,378	08/29/2005	Massimiliano Cavallini	23251	4690

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EXAMINER

MARINI, MATTHEW G

ART UNIT	PAPER NUMBER
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2854

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

✓ 14 2/1

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/528,378	CAVALLINI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Matthew G. Marini	2854	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 August 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/23/05</u>  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

Claims 27, 34, 35, and 37 are objected to because of the following informalities:

Claim 27, line 2 it appears that "the surface" should read --a surface--;

Claim 34, line 3 it appears that "the protrusions" should read --the relief patterns-- to remain consistent with the independent claim;

Claim 35, line 2 it appears that "the surface" should read --a surface--;

Claim 37, line 1 it appears that "solutions" should be --solution-- and the word "contain" should be made plural.

Claims 22-25 are objected to as being improper Markush claims as seen in the MPEP 2173.03 (h). Alternative expressions are permitted if they present no uncertainty or ambiguity with respect to the question of scope or clarity of the claims. One acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C." See *Ex parte Markush*, 1925 C.D. 126 (Comm'r Pat. 1925).

Claim 22-25, line 2 it appears that "the group constituted by" should read --the group consisting of--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

Claims 38 provides for the use of the method to write locally information in the form of bits of a film but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass.

A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 38 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim 39 provides for the use of the method to manufacture electrodes, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 39 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim 40 provides for the use of the method to pattern isolated structures, dots, nanoparticles and signal molecules, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 40 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 21, 22, 25, 27, 29, 30, 32, 33, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface*.

With respect to claim 21, Dehpande teaches in Fig. 1 a printing process for obtaining patterns of nanometer and micrometer dimensions, section I, first paragraph lines 1-2, on a substrate comprising the application of a solution or suspension of a printing material to said substrate, the positioning, without applying pressure, of a stamp provided with relief patterns at a distance of 0nm to 500 $\mu$ m, more specifically 250nm from the substrate, and the evaporation via applied heat of said solution or suspension, as read in the caption of Fig. 1.

With respect to claim 22, Dehpande teaches in Fig. 1 wherein said material is chosen from a group constituted by soluble polymers, section II, second paragraph, lines 5-8, the polymer being polymethyl(methacrylate) in a solution of chlorobenzene.

With respect to claim 25, Dehpande teaches in Fig. 1, wherein said material is chosen from the group constituted by colloidal substances and nonparticles, as PMMA is known in the art.

With respect to claim 27, Dehpande teaches in Fig. 1 wherein the material and/or said solution or suspension is chemically reactive with a surface of the substrate, SI, producing when the conditions are right, grafted structures that form polymer structures from the substrate, as seen in Fig. 1 and section II paragraph 1.

With respect to claim 29, Dehpande teaches in Fig. 1, wherein the stamp has multiple protrusions of arbitrary shape and dimension, section II, third paragraph, lines 2-3, which describe the arbitrary dimensions of the mask/stamp.

With respect to claim 30, Dehpande teaches in Fig. 1, wherein the stamp is a hard stamp, made from silicon dioxide, as read in section II, paragraph 3, lines 1-2, which is a form of silicon oxide.

With respect to claim 32, Dehpande teaches in Fig. 1, wherein the stamp is constituted by a thin film of material, fluorinated surfactant, that floats on said solution ensuring easy separation of the mask and polymer after the process, section II, paragraph 3, lines 4-6.

With respect to claim 33, Dehpande teaches in Fig. 1 wherein the evaporation step occurs at a temperature in the interval between -70 and 300°C, more specifically the article teaches 120-160°C, section II, paragraph fourth, lines 1-3.

With respect to claim 36, Dehpande teaches in Fig. 2b, wherein the solution, PMMA, contains multiple printing materials in the form of solutes, solution of chlorobenzene and perfluoropolyether oil (PFPE), said solutes being suitable to precipitate selectively in different times, this generating controlled nonuniformities of composition in the resulting patterns, section III, paragraph one, lines 7-12.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface* in view of Verschueren et al. (2002/0053296).

As to claim 23, Dehpande teaches all that is claimed in the above rejection of claim 22, except wherein the material is chosen from the group constituted by polyaniline, polyphenylene vinylene, poly(3-alkyl-thienyl) and mixtures thereof. Verschueren et al. teaches in paragraph 32, line 17, the use of polyaniline used as a heat-sensitive material on a lithographic substrate. It would have been obvious to one

of ordinary skill in the art at the time of invention to include the material polyaniline in the process of Dehpande because the compound is capable of converting light into heat from a light source, which would aid in the evaporation of the solution, paragraph 32, lines 5-8.

As to claim 24, Dehpande teaches all that is claimed in the above rejection of claim 22, except wherein the material is chosen from the group constituted by tris-(quinoline) aluminum, coordination compounds, metallic clusters, rotaxanes, polythiophenes, phthalocyaniner, and mixtures thereof. Verschueren et al. teaches in paragraph 32, line 17, the use of metal carbides used as a heat-sensive material on a lithographic substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to include clusters of metal carbides in the process of Dehpande because the compound is capable of converting light into heat from a light source, which would aid in the evaporation of the solution, paragraph 32, lines 5-8.

Claims 26 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface* in view of Kudas et al. (2003/0148024).

As to claim 26, Dehpande teaches all that is claimed in the above rejection of claim 25, except wherein said material is colloidal Au or Ag. Kudas et al. teaches in paragraph 62, 4-7, where a colloidal silver solution is used to produce flat screen displays through a lithographic process. It would have been obvious to one of ordinary skill in the art at the time of invention to replace the solution of Dehpande with the



colloidal silver solution taught by Kodas et al. because the solution allows for an excellent adhesion and sheet resistivity values to the substrate, replacing the traditional costly sputtering or vacuum deposition used to for the direct deposition of metal electrodes onto low temperature substrates such as plastics, paragraph 296 line 1-22.

As to claim 34, Dehpande teaches in Fig. 1 wherein the substrate, Si, has a surface area that is orders of magnitude larger than the dimension of the relief patterns, found on the mask, which measure 100nm.

Claims 28 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface* in view of Screenivasan et al. (6,921,615).

As to claim 28, Dehpande teaches all that is claimed in the above rejection of claim 21, except wherein said distance is changed during imprinting. Screenivasan et al. teaches Fig. 3, setting the template at a gap, 56, then closing the gap to a desired height during the imprinting process. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dehpande to include the step of changing the distance of the gap during imprinting because the spacing between the template and substrate can start uniformly between the two layers and be closed ensuring that the solution or ink fills the patterns of the template, allowing for a better resolution, Col. 9 lines 36-48.

As to claim 35, Dehpande teaches all that is claimed in the above rejection of claim 21, except wherein said stamp is arrange in a inclined configuration with respect

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to the substrate, thus producing on the substrate patterns with a spatially variable thickness. Screenivasan et al. teaches Fig. 1, a stamp, 12, inclined relative to the substrate. It would have been obvious to one of ordinary skill in the art to modify Dehpande to include the inclined stamp of Screenivasan et al. because its disclosed as being known in the art and that produces patterns with variable thickness, Col. 8 lines 19-26.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface* in view of Whitesides et al. (5,900,160).

As to claim 31, Dehpande teaches all that is claimed in the above rejection of claim 21, except wherein said stamp is stamp made from polydimethyl siloxane. Whitesides et al. teaches in Col. 23, line 10, a stamp being made from polydimethyl siloxane. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the stamp of Dehpande to be made from polydimethyl siloxane as described in Whitesides et al. because this material is known in the art to help peel material out of a mold or off a stamp due to non-stick nature of the material.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over the article written by Paru Dehpande and Stephen Y. Chou *Lithographically induced self-assembly of microstructures with a liquid-filled gap between the mask and polymer surface* in view of Screenivasan et al. (7,077,992).

As to claim 37, Dehpande teaches all that is claimed in the above rejection of claim 21, except wherein said solution contains imprinting materials in amounts suitable in reaction volumes on the order of magnitude of picoliters. Screenivasan et al. teaches in Col. 12 lines 45-58 where the fluid is ejected in the magnitude of picoliters, inherently indicating the components of that solution also being in the same magnitude. It would have been obvious to one of ordinary skill in the art at the time of invention to include the volume of printing materials to be in the order of magnitude of picoliters because it allows to the dispersion of the fluid through a piezo-actuated dispensers creating a faster and control dispersion of the fluid on the substrate, improving the consistence between each product, Col. 12 lines 53-59.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew G. Marini whose telephone number is (571)-272-2676. The examiner can normally be reached on Monday-Friday 8:00 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew Marini



09/21/06



REN YAN  
PRIMARY EXAMINER